

## **APPENDIX C: WATER QUALITY MONITORING AND NPS MANAGEMENT**

### **C.1 MONITORING OBJECTIVES**

This section outlines DEQ's overall water quality monitoring objectives that support various aspects of Montana's NPS management program. Numerous federal, state, local agencies, nonprofits, universities, and other organizations are involved in water quality monitoring and assessment programs that often meet one or more of these same objectives. The NPS Program communicates with, coordinates with, cooperates with, and supports our monitoring partners to make the best use of our collective monitoring capabilities.

#### **C.1.1 Problem Identification**

Monitoring can be conducted to collect data used to verify or negate a perceived water quality problem. Relevant water quality parameters are collected and compared to water quality standards or reference conditions.

#### **C.1.2 Water Quality Standards Attainment Assessments and 303(d)**

DEQ assesses waterbodies to determine if they are meeting water quality standards and supporting designated beneficial uses. When performing assessments, DEQ uses data collected by DEQ as well as data collected by other entities if the data meets water quality objectives. Waters meeting standards are identified and placed in one of two different categories of the Integrated Report. Waters not meeting water quality standards are impaired and DEQ places them on the state's list of impaired waters, pursuant to section 303(d)(1)(A) of the federal Clean Water Act.

#### **C.1.3 Monitoring Trends**

Trend monitoring involves a standard suite of water quality parameters collected over a period of years from pre-selected, fixed monitoring stations at pre-determined times of year in order to analyze long-term trends in water quality condition.

DEQ reports biennially on water quality trends on large rivers in Montana's Water Quality Integrated Report to fulfill Clean Water Act Section 305(b) requirements. Fixed station monitoring also helps DEQ in fulfilling border agreement monitoring efforts.

#### **C.1.4 Support TMDL Development and Source Assessment**

TMDL development relies heavily on monitoring data to identify how a waterbody compares to standards and to evaluate pollutant sources and loads. Entities collecting water quality data in areas where DEQ is actively developing TMDLs can support the process by collecting specific parameters at specific locations that can be used to assist with aspects of TMDL development.

#### **C.1.5 Developing and Implementing Watershed Restoration Plans**

DEQ supports the development of science-based, locally-supported Watershed Restoration Plans (WRPs) to guide implementation of best management practices and education and outreach activities aimed at controlling nonpoint source pollution in a watershed. The EPA requires nine minimum elements to be included in WRPs and monitoring and data analysis is a necessary component of those plans. Monitoring data can be used to identify sources of pollution, identify potential restoration project areas, and estimate pollutant loading.

### **C.1.6 Evaluating Effectiveness of Individual Water Quality Improvement Projects (Project Effectiveness Monitoring)**

Monitoring for project effectiveness can build local knowledge of restoration methods and BMPs that work well in a particular watershed or region of the state and may demonstrate that a specific project type is more likely to result in WQ improvements. Types of data may include water samples, photo monitoring, modeling, surveying, remote sensing, and other forms of evaluation.

Projects that receive 319 NPS funding must include project effectiveness monitoring using a DEQ-approved monitoring plan. The monitoring plan may require reporting on nutrient and/or sediment load reductions achieved by the project.

### **C.1.7 Evaluating Effectiveness of Cumulative Water Quality Improvement Activities**

DEQ's water quality assessment and TMDL processes are usually conducted on a watershed scale as opposed to addressing individual impaired waterbodies scattered throughout the state. Likewise, WRPs developed by local entities typically address a wide range of water quality issues and multiple waterbodies throughout a watershed. This underscores the importance of evaluating water quality in the context of landscape-scale human activities and land uses that influence water quality conditions.

Over time, as water quality improvement and protection activities are completed, waterbody or watershed scale improvements are realized. Data can be collected to determine if water quality in impaired watersheds is on a trajectory toward meeting water quality standards and supporting beneficial uses. This information can be used to refine WRPs by identifying waters in need of additional water quality improvement activities. This type of monitoring is also used in a TMDL Implementation Evaluation (TIE) by DEQ. A TIE is an evaluation of progress in implementing reasonable land, soil and water conservation practices and restoring water quality, often at a watershed scale. The process involves evaluating what water quality improvement activities have been implemented and what opportunities for additional improvements remain. The process also involves evaluating existing data to determine if water quality improvements are being realized.

With sufficient data showing evidence of cumulative water quality improvements, DEQ's Nonpoint Source Program may request that DEQ's Monitoring and Assessment Section reassess a waterbody to determine if it is meeting water quality standards and supporting beneficial uses, consistent with Section B.1.8.

### **C.1.8 Reassessment and Potential Success Stories**

DEQ's NPS Program supports water quality improvement and protection activities on impaired waterbodies. Over time, as progress is made through on-the-ground restoration and best management practices, water quality may improve to the point that water quality standards are met and beneficial uses are supported. Having data to substantiate improvements, including evidence of on-the-ground activities and water quality data, is important to trigger investigation and reassessment by DEQ. When a waterbody is removed from the impaired waters list as a result of water quality improvement activities, DEQ reports these achievements as "success stories" to encourage similar actions across the watershed and the state.

This objective involves the collection of water quality indicators relevant to the pollution impairment listing. This may include the collection of primary or secondary parameters required for DEQ assessment methods, or other supplemental information like time-lapse photos showing improvement over space and time. This objective may also require repeated monitoring to demonstrate that water quality improvements are sustained over time.

### **C.1.9 Establishing Baseline Water Quality Conditions**

Water quality conditions can change over time, particularly as human activities and land uses in a watershed change. For example, expansion of residential development or transportation corridors, conversion of grassland to croplands, and natural resource extraction may all influence water quality. Baseline refers to conditions at some level against which future conditions can be referenced. Baseline monitoring involves the measurement of water quality or other parameters, particularly those susceptible to the change anticipated. This information can then be used to compare pre-existing conditions to conditions post-change.

### **C.1.10 Education**

Monitoring can be an effective tool to engage community members in water quality issues and watershed science. Youth programs through schools and adult education programs often incorporate water quality monitoring. Generally, monitoring with education as the primary objective does not intend to collect data that meets specific data quality objectives, and is often used to illustrate concepts rather than to inform assessments of water quality condition, watershed planning, or restoration.

## **C.2 QUALITY ASSURANCE AND CONTROL PROCESSES**

All projects (internal or external to DEQ) collecting water quality data using funds from EPA or DEQ are required to operate under a Quality Assurance Project Plan (QAPP) or equivalent document. A QAPP is a technical document that describes the objectives of a project and the quality assurance management processes and activities necessary to develop data that will support those objectives.

A Sampling and Analysis Plan (SAP) is also required for all projects collecting water quality data using funds from EPA or DEQ. A SAP documents all aspects of sampling and analysis activities to be performed for a particular water quality study or data collection effort to help assure that project objectives will be met. SAPs document the quality of the environmental data and ensure that groups or agencies are aware of the level of data quality for decision making purposes. Even when no EPA or DEQ funds are involved, basic sample planning, analysis, and data control principles should be used.

## **C.3 MONITORING PARTNERSHIPS**

Funding constraints usually limit water quality monitoring activities. Tradeoffs between the quantity and the quality of data collected, in addition to how the data will be used, are important to consider when prioritizing monitoring activities. DEQ's partial solution to addressing water quality monitoring needs with limited funding is to form partnerships. DEQ frequently partners with local, state and federal agencies to achieve common monitoring objectives. In addition, local stakeholder groups, many of which incorporate volunteers to perform monitoring activities, can be trained to collect data that meet specified quality assurance and control requirements, and operate under a formal monitoring plan. Such groups can screen for potential water quality problems and collect data that can identify long-term water quality trends. Montana has many examples of water quality monitoring collaboration among

multiple partners. However, important differences in legal requirements, data collection methods, and quality control needs often exist among partner organizations. These differences can limit the extent to which data can be used between water quality monitoring projects or partners in achieving differing monitoring objectives.

## **C.4 VOLUNTEER WATER QUALITY MONITORING**

Montana has a broad spectrum of citizen-based, volunteer water quality monitoring programs. Many volunteer monitoring (VM) programs are administered by watershed groups, conservation districts, local water quality districts, and non-governmental organizations. At the most basic level, volunteer monitoring helps to engage citizens in the fundamental aspects of water quality and the importance of protecting water resources from NPS pollution, and encourages communities to protect local water resources.

Each group conducting volunteer monitoring is driven by a unique set of monitoring objectives that may include watershed education for youth and adults, collection of baseline data to study water quality status and trends, or monitoring to evaluate the effectiveness of conservation practices and restoration projects. Often, DEQ and local monitoring objectives overlap. However, volunteer monitoring programs sometimes lack adequate funds or technical expertise to collect high quality, credible data. These challenges have prompted DEQ to create a Volunteer Water Quality Monitoring Support Program.

The primary objective of DEQ's VM Support Program is to support the collection of credible data by locally-led, volunteer-based programs that will also support DEQ water quality restoration and protection programs. Support may be supplied directly to VM programs in the form of material or technical support, or may be in the form of partnerships with other entities (e.g., non-governmental, academic, or agency programs) in the state which provide similar support. DEQ's partners in Montana's VM support network include:

- Montana State University Extension Water Quality (MSUEWQ) Program
- Montana Watershed Coordination Council (MWCC)
- Big Sky Watershed Corps
- Montana Watercourse
- Montana Water Center

Examples of material support through DEQ's VM Support Program include providing funds to support laboratory analyses or lending monitoring equipment. Examples of technical support include monitoring design recommendations, development of volunteer-appropriate monitoring methods, reviewing SAPs, and providing training. Visit DEQ's website for more information on the VM Support Program.